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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
John D. Hottovy

Serial No.: 10/699,151

Filed: October 31, 2003

For: Method and Apparatus for Reducing Reactor Fines

Group Art Unit: 1796

Examiner: Cheung, William K.

Atty. Docket: 210330US
CPCM:0020

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November 26, 2007 — Jeanna Reed
Date — Jeanna Reed

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on September 18, 2007, and received by the Patent Office on September 24, 2007. The Commissioner is authorized to charge the requisite fee of $510.00, and any additional fees which may be necessary to advance prosecution of the present application, to the credit card listed on the attached PTO-2038. If the PTO-2038 is missing, if the amount listed thereon is insufficient, or if the amount is unable to be charged to the credit card for any other reason, the Commissioner is authorized to charge Deposit Account No. 06-1315; Order No. CPCM:0020/FLE (210330US00).

1. REAL PARTY IN INTEREST

The real party in interest is Chevron Phillips Chemical Company LP, the Assignee of the above-referenced application by virtue of the executed Assignment, on reel 015102, frame 0238, and the Assignee will be directly affected by the Board's decision in the pending appeal.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. STATUS OF CLAIMS

Claims 1-6 are currently under final rejection and, thus, are the subject of this Appeal. Claims 1-11 and 18-22 are currently pending, with claims 7-11 and 18-22 withdrawn from consideration. Claims 12-17 have previously been cancelled.

4. STATUS OF AMENDMENTS

As the instant claims have not been amended since the last Final Office Action, there are no outstanding amendments to be considered by the Board.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates generally to the polymerization of olefin monomers in a liquid diluent. The Application contains two independent claims, namely, claims 1

and 7. Only claim 1 is the subject of this Appeal, as claim 7 has been withdrawn from consideration. The subject matter of claim 1 is summarized below.

Claim 1 relates to a polymerization process (e.g., Fig. 1) including polymerizing in a loop reactor (e.g., loop reactor 10) having an inner surface, an olefin monomer (e.g., ethylene) in a liquid medium (e.g., diluent) to produce a fluid slurry comprising solid olefin polymer particles (e.g., polyethylene) in a liquid medium (e.g., diluent and ethylene), wherein the inner surface of the loop reactor (e.g., loop reactor 10) has a root mean square surface roughness less than about 120 micro inches. *See, e.g.*, Application, page 1, ¶ 5; page 2, ¶¶ 10-14; pages 6-7, ¶¶ 24-28.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Sole Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's first ground of rejection in which the Examiner rejected claims 1-6 under 35 U.S.C. § 103(a) as being unpatentable over Rohlfing et al., U.S. Patent No. 3,244,681 (hereinafter "Rohlfing").

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Section 103. Accordingly, Appellant

respectfully request full and favorable consideration by the Board, as Appellants strongly believe that claims 1-6 are currently in condition for allowance.

Sole Ground of Rejection No. 1:

The Examiner rejected claims 1-6 under 35 U.S.C. §103(a) based on the Rohlfing reference. Appellant respectfully traverses this rejection.

Legal Precedent

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). To establish a *prima facie* case, the Examiner must show that the combination or modified reference includes all of the claimed elements, *and* also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the reference(s). *See Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). Further, the Supreme Court has recently stated that the obviousness analysis should be explicit. *See KSR Int'l Co. v. Teleflex, Inc.*, 82 U.S.P.Q.2d 1385 (U.S. 2007). "[R]ejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *See id.* (quoting *In re Kahn,* 441 F.3d 977,988 (Fed. Cir. 2006)).

Deficiencies of the Rejection

The Examiner acknowledged that the cited reference does not disclose "a root mean square surface roughness less than about 120 micro inches," as recited in claim 1. *See* Office Action Mailed July 10, 2006, page 4. Nevertheless, the Examiner incorrectly asserted that because Rohlfing discloses a tubular closed loop reaction zone having smooth surfaces, it would have been obvious to one of ordinary skill in the art to polish the inner surface of the Rohlfing loop reactor to a root mean square surface roughness less than about 120 micro inches. *See id.* at 5.

The Examiner contended that "although [Rohlfing] may not use the same units for measuring smoothness or roughness, applicants must recognize that the recited 'root mean square surface roughness' is merely a functional language for gauging roughness or smoothness that does not lend itself to patentability." *See* Office Action Mailed July 10, 2006, page 4. First, Appellant notes that the cited reference employs no units for smoothness or roughness, but merely states that the surface of the Rohlfing reactor is smooth. *See* Rohlfing, col. 1, lines 60-65. Such a nonspecific statement in Rohlfing does not teach or suggest the finish of a surface having a roughness less than about 120 micro inches, as claimed.

Further, as indicated in the present specification, Appellant believes that the walls of loop reactors (such as the Rohlfing reactor) in the prior art possess a roughness *greater* than 125 micro inches. *See* Application, page 7, ¶ 28 ("Known slurry loop reactors have

root mean square surface roughness values of 125 or greater (in units of micro inches). The root mean square surface roughness of the slurry loop reactor of the present invention is less than 125 micro inches . . ."). In fact, Appellant believes that the roughness of the Rohlfing is well above 125 micro inches (far outside of the claimed range) when considering the age of the reference.

Second, Appellant again traverses the Examiner's contention that the presently-recited unit of roughness is merely functional language not lending itself to patentability. After all, a degree of smoothness (which may be expressed in units of roughness as is typical in the pertinent art) of a surface of the polymerization reactor is plainly patentable. The present application discloses and claims specific processes for conducting polymerizations in reactors having a maximum surface roughness, and also generating and maintaining such a maximum surface roughness. *See, e.g.*, Application, pages 4-5, ¶¶ 19-21.

In conclusion, while the Rohlfing reference mentions "a tubular closed loop reaction zone having smooth surfaces," the cited reference is absolutely devoid of the teaching or suggestion of a loop reactor surface having a *root mean square surface roughness less than about 120 micro inches*. *See* Rohlfing, col. 1, lines 60-65. Furthermore, there is no appropriate reason to modify the Rohlfing reference to have a mother surface. For example, there is no indication of operating problems (e.g., fouling, excessive pressure differential, polymer quality problems, etc.) or other needs for a much

smoother reactor surfaces. For these reasons, claim 1 and its dependent claims 2-6 are patentable over the cited reference. Therefore, Appellant respectfully requests that the Examiner to withdraw the rejection and allow claims 1-6.

Conclusion

Appellant respectfully submits that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: November 26, 2007

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8. APPENDIX OF CLAIMS ON APPEAL

1. A polymerization process comprising:

polymerizing in a loop reactor having an inner surface, at least one olefin monomer in a liquid medium to produce a fluid slurry comprising solid olefin polymer particles in a liquid medium, wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 120 micro inches.

2. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 110 micro inches.

3. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 90 micro inches.

4. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 70 micro inches.

5. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 50 micro inches.

6. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 30 micro inches.

7. A method of reducing a friction factor of an inner surface of a loop reactor, the method comprising:

a first polymerization step comprising polymerizing in a loop reactor at least one olefin monomer in a liquid medium to produce a first product fluid slurry comprising a liquid medium and solid olefin polymer particles having a melt index less than 0.3 gm/10 min, wherein the solid olefin polymer particles in the first product slurry impact and smooth the inner surface of the loop reactor, reducing the friction factor of the inner surface;

a second polymerization step comprising polymerizing in said loop reactor at least one olefin monomer in a liquid medium to produce a second product fluid slurry comprising a liquid medium and solid olefin polymer particles having a melt index greater than 0.4 gm/10 min, wherein the solid olefin polymer particles in the second product slurry coat the inner surface of the loop reactor along rough spots of the inner surface, further reducing the friction factor of the inner surface; and

performing the first and second polymerization steps for respective lengths of time such that a root mean square surface roughness of the inner surface of the loop reactor is reduced to less than about 120 micro inches, wherein the respective lengths of time are specified based on size of the reactor,

melt index of the polymer particles, velocity at which the reactor contents are circulated in the reactor, roughness of the inner surface at the start of the first polymerization step, or molecular weight of the polymer particles, or any combination thereof.

8. The method of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.2 gm/10 min.

9. The method of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.1 gm/10 min.

10. The method of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.2 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.5 gm/10 min.

11. The method of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.1 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.5 gm/10 min.

18. The method of claim 7 wherein the friction factor is reduced such that the inner surface has a root mean square surface roughness less than about 100 micro inches.

19. The method of claim 7 wherein the friction factor is reduced such that the inner surface has a root mean square surface roughness less than about 90 micro inches.

20. The method of claim 7 wherein the friction factor is reduced such that the inner surface has a root mean square surface roughness less than about 70 micro inches.

21. The method of claim 7 wherein the friction factor is reduced such that the inner surface has a root mean square surface roughness less than about 50 micro inches.

22. The method of claim 7 wherein the friction factor is reduced such that the inner surface has a root mean square surface roughness less than about 30 micro inches.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.